Contents

Section 2

Southeast Colorado River Basin

Utah State Water Plan

Executive Summary

2.1 FOREWORD

Within the broad responsibility to enhance the quality of life and general welfare of its citizens, the state of Utah has the specific obligation to plan for and encourage the best use of its resources. The *State Water Plan* (1990)[16] provides the statewide foundation and direction. More detailed plans have been prepared for the *Bear River, Kanab Creek/Virgin River, Weber River, Jordan River, Sevier River, Uintah, Utah Lake and West Colorado River basins.* The *Southeast Colorado River Basin and West Desert(includes Columbia River) Basin* will be the final plans in this series. This plan was prepared under the direction of the Board of Water Resources.

The purpose of this plan is to identify potential conservation and development measures and projects and to describe alternatives to alleviate the problems, needs and demands of the local people. The final selection of alternatives for meeting future needs will be made by the local people.

2.3 INTRODUCTION

Water planning has always been a part of Utah's history. Current water planning needs add more impetus. This section presents the general planning guidelines used to insure continuity. Preparation of this plan has involved many local, state and federal entities who are involved in and have expertise regarding water resources. The planning process allows for review and approval at various stages of completion.

The Southeast Colorado River Basin is located in the southeast corner of the state and covers 6,976,250 acres (10,900 square miles) in Grand and San Juan counties. The basin area is 12.8 percent of the state. Part of the Navajo Indian Reservation and the Ute Mountain Ute tribal lands are located in southern San Juan County. The southern end of the Uintah and Ouray Indian Reservation is in northern Grand County. The largest communities are Blanding, Moab and Monticello. Aneth is the largest Navajo Nation community.

Like the State Water Plan (1990), the Southeast Colorado River Basin Plan contains 19 sections. In addition, there is Appendix A, Acronyms, Abbreviations and Definitions; and Appendix B,

The basin is located in the Colorado Plateau Province with elevations varying from 3,700 feet at Lake Powell to 12,720 feet on Mount Peale in the La Sal Mountains. The primary river systems are the Colorado, Dolores, Green and San Juan rivers. Most of the available water supply comes from smaller streams such as Mill Creek, Pack Creek, Indian Creek, North and

South creeks and Recapture Creek. The area is characterized by high mountains and deeply incised canyons providing colorful, spectacular rock formations. People come from all over to enjoy this popular recreational area.

In this arid and semi-arid area, summer temperatures usually reach the high 90s and winter temperatures are 10°F to 20°F depending on the location. The annual precipitation ranges from 6 to 30 inches depending primarily on elevation. Frost-free days vary from 231 days at the Hite Marina to 119 days at La Sal.

There are five vegetative types consisting of conifer-aspen stands and shrubs in the higher elevations to shadscale-blackbrush cover in the lower areas. Intermediate elevation vegetation includes pinyon-juniper and sagebrush. Soils vary from loams to sandy to clay with areas containing sands and gravels. There are also large areas of barren sandstone rock formations and intrusions of partially eroded lacolith domes.

Most of the higher elevation lands are used for wildlife habitat or livestock grazing and some timber production. The lower areas are used for rangeland, cropland and recreation. There are 8,930 acres of irrigated cropland and 130,400 acres of dry cropland. The grazing areas cover about 2.36 million acres or about 34 percent of the basin.

Abajo Mountains

The private lands and state lands each cover about seven percent of the area or a total of over one million acres. The federal and Indian lands cover over 85 percent (5.9 million acres) with the Bureau of Land Management administering the largest area at 51 percent or over 3.5 million acres. The Navajo Indian Reservation, Ute Mountain Ute and Northern Ute tribal lands cover about 18 percent of the basin (1.27 million acres).

Although the Southeast Colorado River Basin has been called a "vast contiguity of waste" whose main function was "to hold the world together", it has a long and rich history. Elk Mountain (Moab area) was the first settlement in 1855. This was soon abandoned. Cattle were brought into the area and the livestock industry thrived until the long drought toward the end of the 1800s. As the settlements increased in the 1880s, water was diverted for irrigation and domestic use. The diversion of water from local streams and from groundwater aquifers satisfied the demands until the late 1950s but there was soon a need for reservoir storage. By the 1980s, three large reservoirs had been constructed along with development of a culinary well field near Moab.

2.4 DEMOGRAPHICS AND ECONOMIC FUTURE

The economy of the Southeast Colorado River Basin has expanded from an agricultural base to one where recreational, commercial and industrial enterprises are important. Moab, Monticello and Blanding are the largest cities and they are also the trade and service centers.

The Indian populations were established in the area in the 1500s and 1600s. White settlers and cattlemen came into the area and began establishing themselves from the mid- to late 1800s. The population was 916 in 1890 and had grown to 2,172 by the turn of the century. By 1950, it had increased to 7,218, mostly in San Juan County. With the uranium boom and the popularity of recreation and tourism, the population had increased to 23,247 by 1998, 1.1 percent of the state and still only 2.1 people per square mile. There are about 6,865 Navajo Indians living on and about 1,200 living off the reservation. The Ute Indian population at White Mesa is about 220 with about 70 more living in Allen Canyon and in other areas. The total

basin population is projected to be 39,477 by 2020 and 90,070 by 2050. The Navajo Nation and Ute White Mesa population are projected to be 8,255 and 384, respectively, by 2020 and 12,405 and 582, respectively, by 2050.

Agriculture only accounts for about 3.2 percent of the total employment. Four sectors provide most of the employment. These are: 1) Trade, 2,460; 2) government, 2,359; 3) non-farm proprietor, 2,410; and 4) service, 2,337. Total employment was 11,839 in 1998 and is projected to increase to 21,930 by 2020. The current rate of unemployment within the Navajo Nation is over 50 percent with about one-half of the families living below the poverty level.

2.5 WATER SUPPLY AND USE

Water has been and still is a scarce resource. Much of the water from the perennial streams originating within the basin has been developed. There is still some undeveloped surface water and a supply of groundwater in several aquifers. Most of the surface water originates in the La Sal and Abajo mountains along with some of the recharge to groundwater aquifers. One of the first things those coming into the area did was to develop the water supply for irrigation of crops and for domestic use.

The total surface water yield is about 148,420 acre-feet annually. The highest yielding streams supply the areas around Moab, Monticello and Blanding. In addition, there is some water diverted from the Colorado River in the Castle Valley area and from the San Juan River in the Aneth/Montezuma Creek area and around Bluff.

San Juan River

Groundwater is withdrawn from two types of aquifers, consolidated rock and unconsolidated or alluvial deposits. There are consolidated rocks throughout most of the basin with varying amounts and quality of groundwater. The primary alluvial aquifers are located in Spanish Valley and Castle Valley where well production has been measured as high as 2,500 gpm and some springs at over 300 gpm. Total culinary water supplies from groundwater are about 14,990 acre-feet annually, 2,770 acre-feet from springs and 12,220 acre-feet from wells.

Total diversions for cropland irrigation are 34,950 acre-feet annually with about 18,430 acre-feet depleted. Of this amount, 6,640 acre-feet are pumped from the Colorado River and about 2,000 acre-feet are diverted from the Dolores River.

There are 5,569 acre-feet diverted annually for culinary use in community systems including 1,490 acre-feet diverted for private domestic systems. Secondary water use is 3,007 acre-feet annually and self-supplied industrial use is 2,030 acre-feet annually.

The net water surface evaporation from reservoirs and lakes is about 2,050 acre-feet. In addition, there is use by wetlands and riparian vegetation. Non-consumptive use includes instream flows for fish and wildlife purposes and recreation activities, both stream and flat-water.

2.6 MANAGEMENT

When the early settlers moved into the area, there was not a need for intensive management of the water resources. As the number of water users increased, management became important in order to make the best use of the available supplies. The first diversion structures were earth while later diversions included a water wheel and a log crib dam. Since then, concrete diversions and pipelines have become common place. Reservoirs have been constructed to store water during high flows for use at a later time. This has made more efficient use of the runoff from the high mountain areas.

There are 15 different types of water provider agencies. These include water and sewer agencies, municipal public works departments, water conservancy districts, water users associations and irrigation companies. These providers deliver water for one or more uses to different types of clientele. In addition, the Navajo Nation has its own management systems for culinary water delivery.

There are 20 public community water systems, 4 in Grand County and 16 in San Juan County including 9 within the Navajo Indian Reservation and one in White Mesa. There are an additional 8 community systems on the Navajo Indian Reservation of which only one is monitored or regulated by the state of Utah.

There are seven irrigation companies delivering water to lands for crop production. Water users obtain supplies from 30 lakes and storage reservoirs, 19 built primarily to supply irrigation water.

As the demand for water increases, management entities will have to become more efficient in order to satisfy these needs. This will require implementing practices to make sure the watersheds are managed to protect the water yielding areas. Conjunctive management of surface water and groundwater will be needed in some cases to optimize the use of both sources. Delivery systems will have to be maintained and expanded. There are 12 potential reservoir sites presented for possible future development.

2.7 REGULATION/INSTITUTIONAL CONSIDERATIONS

The responsibility for water regulation rests primarily with three state agencies. The State Engineer, as Director of the Division of Water Rights, is responsible for the allocation and division of water as well as for dam safety. The three largest dams, Ken's Lake, Loyd's Lake and Recapture Creek Reservoir, are classified as high hazard because of the potential for loss of life and property damage. Water quality regulations are administered by the Water Quality Board and Drinking Water Board. The Division of Water Quality and Division of Drinking Water, respectively, are staff for these two boards. Water conservancy districts, special service districts, cities and towns also have responsibilities for regulating and managing certain aspects of the water resources.

Federal reserved water rights will play an important part in water development and use in the Navajo Indian Reservation and the several national parks and monuments. Reserved rights for the Navajo Nation have not been defined. This could impact future use of the Colorado River. The Ute Mountain Utes at White Mesa have a certificated water right. Reserved water rights for the national parks and monuments are being pursued.

2.8 WATER FUNDING PROGRAMS

Development of water resources has always required funding although many of the early projects were funded "in-kind." Much of the funding comes from the local water users, either as match for state or federal monies or to pay back loans.

There are eight state agencies and boards with 15 programs available to provide funding for water-related projects. These programs are available to assist with irrigation, drinking water, recreation, waste water treatment, fish habitat and other related facilities. Grants of over $9.5 million and loans of nearly $28.8 million have been provided for water-related projects. Additional funds were also provided but data were not available.

There are eight federal agencies with 17 programs with funding available for water-related projects. These programs can be used for conservation and rehabilitation of farmland including reducing erosion and flooding. They also provide funding for irrigation and culinary water supplies, water quality improvement, damage mitigation and other related needs. Federal agencies have provided grants of nearly $216.5 million (including cost-sharing of over $7.4 million) and loans of nearly $4.7 million.

Nearly $151 million of the grant funds were for three water reclamation projects by the Bureau of Reclamation from 1927-69.

2.9 WATER PLANNING AND DEVELOPMENT

As the area grows, the demand for water will increase requiring planning for the conservation and development of the limited resources. Long-range planning is important because of the many state, federal and local agencies and entities involved. One goal should be to coordinate the water-related activities of these entities when assistance is requested by the local people.

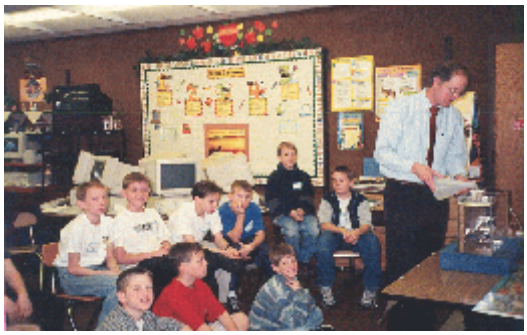
The culinary municipal and industrial use is expected to increase from 5,570 acre-feet in 1996 to 11,140 acre-feet in 2020 and 27,970 acre-feet by 2050. This demand can be reduced by implementing conservation practices. Only 30 acre-feet of culinary water provided by public community systems was used for industrial purposes but there was 2,030 acre-feet of reported self-supplied use. The self-supplied industrial water use is expected to increase to 4,560 acre-feet by 2020 and to 6,720 acre-feet by 2050. Secondary water use was 1,140 acre-feet in 1996. This will increase to 2,350 acre-feet by 2020 and 5,610 acre-feet by 2050.

The annual diversions for cropland irrigation are about 34,950 acre-feet, 13,800 acre-feet in Grand County and 21,150 acre-feet in San Juan County. This use is expected to remain about the same or decrease slightly due to encroachment of urban areas.

The reoccurring droughts bring the realization that more dependable water supplies are needed, especially those for municipal and industrial uses. Local water planners are pursuing other alternative sources for future water development. These include construction of a dam on North Creek to store 1,200 acre-feet of stream flows or diversion of the water to Loyd's Lake. Dry Wash No. 2 Reservoir could be enlarged to raise the storage capacity from 185 to 370 acre-feet. The San Juan Water Conservancy District is investigating buying water from the Dolores River Project in Colorado and piping it to Monticello and Blanding. There is also potential storage in Coal Bed Canyon. The Navajo Area Indian Health Service has 11 active projects, three funded, to extend and improve the culinary water supply on the reservation.

Water conservation programs can make the present supplies go farther. This makes it imperative to carry out a conservation education program, particularly for those at the elementary school level. Cloud seeding programs can increase the available water supply.

The only issue is resolution of the Indian reserved water rights. These rights need to be established under Utah water law so future planning can be carried out within the proper context.



Water Education

2.10 AGRICULTURAL WATER DEVELOPMENT

Much of the surface water supply has been developed but there is still the possibility of groundwater development for agricultural uses. The limited extent of irrigated agriculture is primarily due to the lack of economically developable water supplies. The major irrigated areas are located in Spanish Valley near Moab, around Monticello, in the Blanding area, and along the San Juan River near Bluff. Most of the early water projects were to develop water for irrigation of crops. Recent projects include the construction of Ken's Lake, Loyd's Lake and Recapture Creek Reservoir.

There are currently 8,929 acres of irrigated cropland. The most common crops grown are alfalfa and pasture which account for over 7,500 acres of the total. Cropland producing cash crops such as orchards and vineyards are mostly located in Spanish Valley. There are 34,950 acre-feet of water diverted for irrigation and 18,430 acre-feet are depleted. In addition, there are 130,400 acres of dry cropland, 128,200 acres in San Juan County and 2,200 acres in Grand County. Winter wheat is the principal crop while safflower is also important.

There is a shortage of water for much of the irrigated cropland, especially during the late part of the growing season. As agricultural costs increase, it is not economically feasible to develop additional agricultural water unless it can be done as part of a municipal and industrial project. The best opportunities to increase water supplies are on-farm practices to make more efficient use of the present resources. There is also the potential for development of additional municipal and industrial water along with some agricultural water from the Dolores River Project and pumping water from the Colorado and San Juan rivers. The irrigation water is generally of good quality except that diverted from the San Juan River is high in sediments.

Erosion is a problem in some areas. In the upper Montezuma Creek dry cropland areas, annual gross erosion rates are about 6 tons/acre. Some upper watershed areas are eroding at 39 tons per acre annually. Presently, there is severe erosion on 82,500 acres of rangeland yielding 236,460 tons of sediment and 17,600 acres of cropland yielding 216,480 tons annually. The total salt load is 15,230 tons annually. Establishment of a healthy watershed is the best way to reduce erosion and the resulting downstream sedimentation and salt loading.

2.11 DRINKING WATER

There are 52 public water systems. These include 20 public community systems, 24 public non-community systems and 8 Navajo Nation community systems. The public community systems deliver 3,867 acre-feet; the public non-community systems, 212 acre-feet; and private domestic systems use about 1,490 acre-feet. The average basin-wide use by the public community systems was 206 gallons per capita per day and 228 gpcd when all drinking water uses are included, lower than the state average of 267 gpcd. About 79 percent of the culinary water supply comes from groundwater. The three communities using surface water with water treatment plants to bring the water up to state standards are Blanding, Halchita and Monticello. All of the systems and facilities are operated according to the state and federal safe drinking water acts. The demand by 2020 will be about 11,140 acre-feet and 27,980 acre-feet by 2050. No allowance for conservation is included. All of the public community systems have adequate water to satisfy the 2020 demand. Moab is limited by 1,158 acre-feet in system capacity to meet the 2020 demand and by 4,973 acre-feet to meet the 2050 water supply demand.

The future use by the Navajo Nation is based on a 2.48 percent population growth rate and 160 gallons per capita day. The culinary water use will increase from the present 484 acre-feet (132 gpcd) to 1,053 acre-feet by 2020 and 2,198 acre-feet by 2050.

The City of Blanding needs to increase the capacity of its water treatment plant in order to meet future demands. The community of Halchita has a need to upgrade their water treatment plant and Mexican Hat needs a better water supply. There is the potential for these two communities to build a treatment plant to serve the needs of both. A study is now underway in Spanish Valley to determine if the groundwater aquifer can be developed to meet the projected demand. The Town of Castle Valley is doing a groundwater supply and septic tank density study to determine the population the local aquifer will support.

2.12 WATER QUALITY

The water quality in most of the tributary streams is good, usually with total dissolved-solids less than 300 µmhos/cm. These streams are the major surface water supply for most of the uses within the basin. The Colorado River, Green River and San Juan River all average less than 1,000 µmhos/cm while the Dolores River averages just over 1,100 µmhos/cm. The groundwater quality varies depending on the aquifer, its depth and the location in regards to the recharge area. Most of the bedrock aquifers yield water that is fresh (0 to 1,000 mg/L) to moderately saline (3,000 mg/L). The Navajo sandstone generally yields high quality water except in the Aneth area where it approaches briny conditions (more than 35,000 mg/L). Wells in Spanish Valley generally produce water with total dissolved-solids concentrations less than 500 mg/L (848 µmhos/cm) and over two-thirds of these wells with less than 250 mg/L (424 µmhos/cm). The alluvial aquifers in Castle Creek yield water with about 177 mg/L (300 µS/cm). Wells sampled in the Cutler formation in Castle Valley had total dissolved-solids ranging from 497 mg/L (842 µmhos/cm) to 2,572 mg/L (4,360 µmhos/cm).

The Clean Water Act requires the Division of Water Quality to monitor pollution of the surface water and groundwater resources. They administer the Pollutant Discharge Elimination System at the federal and state levels. There are eight wastewater treatment lagoons under this program and one mechanical secondary treatment plant. The surface water reservoirs, lakes and streams are given beneficial use classifications. These determine which water is available for various uses and also indicates the trophic status.

The Division of Water Quality has initiated a monitoring program which will define sources of pollution exceeding the state standards. Actions will be determined to bring polluted water bodies within the standards or they may be reclassified. Areas with pollution problems include Spanish Valley and Comb Wash. There is also a problem where there are tailings piles left from ore processing activities. Water moving through these piles can leach contaminants into surface water and groundwater supplies.

There are two issues. One discusses the problem of contamination from septic tanks and drain fields. The other discusses the regional contamination of water supplies from mining tailings ponds.

2.13 DISASTER AND EMERGENCY RESPONSE

Floods and droughts are the most frequent disaster-related occurrences in the basin. Local governments have the responsibility to initiate the first response to any disaster or emergency. If the event is beyond their capability, the state can be called in for assistance. Federal assistance is also available in cases of a major occurrence.

Most communities in the basin are located in close proximity to the perennial streams. This makes them susceptible to flooding, especially from high intensity cloudbursts. Some flood plain studies have been conducted but Moab is the only community eligible under the National Flood Plain Insurance Program. San Juan County has also passed ordinances making the unincorporated areas eligible.

Drought conditions have occurred at varying frequencies in the past. Droughts are more insidious, beginning slower and usually lasting over longer periods of time than other disasters.

Local governments should prepare Emergency Operations Plans in order to respond efficiently to any disasters. Disaster response should be coordinated at the local and state levels. The only issue describes the need for flood plain management. Plans should be prepared for communities within mapped flood plains so they can manage developments in these areas.

2.14 FISHERIES AND WATER-RELATED WILDLIFE

The basin is home to generally healthy populations of native fish and wildlife species

ranging from the high mountain to the desert environments. Settlement of the area has brought about some decline in population although some are making a comeback.

There is a diversity of sport fish from trout in the higher elevations to warm water species in the lower areas. The riparian areas provide the food, water, cover and space habitat needed for wildlife more dependent on water to maintain the species. The Colorado, Green and San Juan rivers contain four endangered species of fish. These are the Colorado pikeminnow, humpback chub, bonytail chub and razorback sucker. The Upper Colorado River Recovery Implementation Program is a 15-year effort aimed at the recovery of these species of fish.

Protection of fish and wildlife habitat is important for their survival. This can be accomplished by cooperative mitigating actions where water development is planned and by management of watersheds to provide adequate habitat. The lakes and streams have been given a beneficial use classification according to their value as a fishery. There are four issues. These discuss the loss of wetlands and riparian habitat, irrigation water diversion dams, winter fish kills, and the impacts of tourism.

Mule deer habitat is important

2.15 WATER-RELATED RECREATION

The scenic and nationally known recreational aspects of the area are a major attraction. Many commercial enterprises have been developed to take advantage of these resources. The three state parks provide scenic vistas of the Colorado and San Juan rivers from outlooks nearly 2,000 feet above. Edge of the Cedars State Park Museum has an unequaled collection of Anasazi pottery and the remains of an Ancestral Pueblo Village. There are two national parks, three national monuments, one national recreation area, one wilderness area and one national forest. In addition, there are large areas of public domain providing spectacular scenery, hiking, 4-wheeling and other recreational activities from alpine environs to outstanding desert panoramas. The Colorado, Green, Dolores and San Juan river corridors provide hiking, touring and rafting experiences. There were over 5,000 river rafting trips in 1997. There are over 40 facilities for camping.

Water safety is becoming a problem as is conflicting uses of bike and hiking trails. The protection of ancient Indian cultural areas and artifacts is an increasing concern with more use of these remote areas. Public education programs seem to be the best solutions along with law enforcement in problem areas.

2.16 FEDERAL WATER PLANNING AND DEVELOPMENT

The federal government has been involved in many programs in the Southeast Colorado River Basin. While past activities were oriented around projects, they are now more involved in conservation and protection of the resources. One of the main concerns is for the federal government to be part of the coordinated efforts regarding the resources along with local and state involvement. Coordination is imperative considering the large areas of federal land in the basin.

Major activities include management of the public lands by the Departments of the Interior and Agriculture and several assistance programs by several other agencies in these departments. There have not been any recent major federal development projects in the area..

2.17 WATER CONSERVATION

Water conservation can substantially reduce the long-term demand for water when it is

properly implemented. Significant reduction in water use can be achieved when people understand the reasons to conserve. This has always been a water-short area so most people are aware of the associated problems.

Agriculture is the largest water user in the area so conservation of irrigation water can have the biggest impact. Some delivery systems lose about 10-20 percent of the water. Improved conveyance systems with on-farm sprinklers or other efficient irrigation methods can increase the overall efficiency. The present overall irrigation efficiency is about 50 percent which is high when compared to the state average.

About 79 percent of the municipal and industrial water comes from groundwater. All of the surface water use is in San Juan County in the communities of Blanding, Halchita and Monticello. The average drinking water use from public community systems for Grand County is 263 gallons per capita per day (gpcd) and for San Juan County is 162 gpcd, 185 gpcd excluding the Navajo Nation. The basin average is 206 gpcd, 61 gpcd less than the state-wide average of 267 gpcd.

As the basin population increases, seven communities will be limited by the volume of water they can deliver with their existing systems by 2020. By the year 2050, some communities will be short of water supplies. Conservation will enable communities to extend the time period when system expansion will be required or when additional supplies will be needed. Water rates can provide a strong incentive to use municipal water more efficiently. Conservation can be achieved through use of low water-using fixtures in the home and planting low water-using landscaping. Water use by large water-using areas such as golf courses and parks can be reduced by better scheduled irrigations.

Two issues are discussed. One of these concerns community water management and conservation plans and the other discusses water pricing as a means of achieving conservation.

2.18 INDUSTRIAL WATER

Industry is not a major water user but this can change dramatically with fluctuations in mining or other industrial activities. Various mining activities have been the largest users of water although the oil industry has also had major impacts, particularly on groundwater. At present, use of culinary water for industrial purposes is insignificant. Industries that supply their own water now use about 2,030 acre-feet. This self-supplied industrial water use will increase to 4,560 acre-feet by 2020 and 6,720 acre-feet by 2050.

There is concern about contamination of the groundwater by tailings piles left after processing of mined ore is discontinued. The uranium tailings pile near Moab is now being considered for capping or removal. Removal proponents claim their will still be leaching of toxic materials even if the pile is capped.

2.19 GROUNDWATER

Groundwater development will become increasingly important as the demand for municipal water increases. The development of groundwater is more complex than that of surface water because it is hidden from view. Groundwater has been developed from two types of aquifers, consolidated rock aquifers and unconsolidated or alluvial aquifers.

The permeability of the water bearing rocks is determined by the geologic structure. The most prolific aquifers are found in the Salt Anticlines and in the Hatch Syncline structures. The quality of the groundwater is often better in areas closer to the recharge areas and at shallower depths. The “N” or Navajo sandstone aquifer is the most prolific water yielding aquifer in the basin. The Navajo sandstone is also part of the Glen Canyon Group providing water in the Spanish Valley area. There are two major areas where groundwater is produced from alluvial aquifers. These are Castle Valley and Spanish Valley.

The basin is underlain by the Paradox formation which consists largely of evaporite

deposits. The top of this brine layer ranges in elevation from below sea level to about 6,540 feet. Salt water intrusion is apparently occurring in the Aneth area.

Groundwater for public water supplies is drawn from wells (12,220 acre-feet) and springs (2,770 acre-feet). This does not include pumpage from domestic wells. In addition, there are unmonitored springs that discharge groundwater. Groundwater supplies for culinary use are primarily pumped from the alluvial aquifers in Castle Valley and Spanish Valley.

Generally the water quality in Spanish Valley is good with total dissolved-solids of 300 mg/L or less. Some springs flow up to 300 gallons per minute with some wells producing up to 2,500 gallons per minute. Water quality in the alluvial aquifer in Castle Valley ranges from 211 mg/L to 1,156 mg/L.

Two issues are discussed. One is the need for development of long-range plans for groundwater management and the other is the need for regional groundwater exploration and an inventory of developable supplies. ❑